

Claims

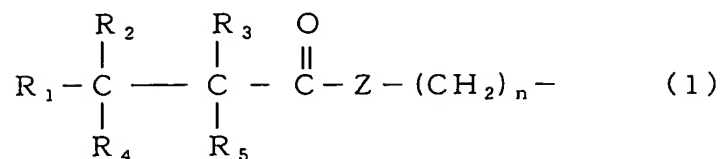
1. A surfactant composition comprising a cationic surfactant as compound (A), at least one compound as compound (B) selected from the group consisting of anionic aromatic compounds and bromide compounds, and a cationic polymer (C), wherein compounds (A) and (B) are selected for the surfactant composition when meeting the condition wherein a combination of the compounds (A) and (B) ensures that the viscosity at 20°C of a solution prepared by mixing an aqueous solution S_A , which solution has a viscosity of 100 mPa · s or less at 20°C, of compound (A) with an aqueous solution S_B , which solution has a viscosity of 100 mPa · s or less at 20°C, of compound (B) in a ratio by weight of 50/50 is at least two times the viscosity of any one of the aqueous solutions at 20°C before being mixed.

2. The surfactant composition according to Claim 1, wherein the cationic polymer (C) comprises a cationic nitrogen.

3. The surfactant composition according to Claim 2, wherein the cationic nitrogen of the cationic polymer (C) is a quaternary nitrogen.

4. The surfactant composition according to Claim 2 or 3, wherein the cationic nitrogen of the cationic polymer (C) is bonded with at least one group selected from the group consisting of an alkyl group having 1 to 22 carbon atoms, a polyoxyalkylene group containing an oxyalkylene group having 2 to 8 carbon atoms, a hydrogen atom and a group represented

by the following formula (1):



wherein R_1 to R_5 , which may be the same or different, respectively represent a hydrogen atom or an alkyl or alkenyl group having 1 to 22 carbon atoms, Z represents -O- or -NY-, wherein Y represents a hydrogen atom or an alkyl group having 1 to 10 carbon atoms, and n denotes a number from 1 to 10, provided that R_1 and R_3 may be incorporated into the polymer structure and in this case, R_1 and R_3 are not present.

5. The surfactant composition according to any one of Claims 2 to 4, wherein the cationic nitrogen of the cationic polymer (C) is derived from a diallyldimethylammonium salt.

6. The surfactant composition according to any one of Claims 2 to 5, wherein the cationic polymer (C) has a structure derived from a monomer selected from at least one or more monomers selected from the group consisting of a (meth)acrylic acid monomer having a cationic group, a styrene type monomer having a cationic group, a vinylpyridine type monomer, a vinylimidazoline type monomer and a diallyldialkylamine type monomer.

7. The surfactant composition according to any one of Claims 1 to 6, in which the cationic polymer (C) has a cation density of from 0.5 to 10 meq/g.

8. The surfactant composition according to any one of Claims 1 to 7, in which 1 to 500 parts by weight of the cationic polymer (C) is contained per 100 parts by weight of the compound (A).

9. A kit to obtain the surfactant composition according to any one of Claims 1 to 8, comprising a combination of a composition (α) containing the compound (A), a composition (β) containing the compound (B) and a composition (γ) containing the cationic polymer (C) or a combination of a composition (I) which contains any two of the compound (A), the compound (B) and the cationic polymer (C) but does not contain the remainder one and a composition (II) containing the remainder one which the composition (I) does not contain.

10. Use of the surfactant composition according to any one of Claims 1 to 8 as a slurry rheology modifier.

11. A slurry rheology modifier comprising the surfactant composition according to any one of Claims 1 to 8.

12. A slurry comprising the surfactant composition according to any one of Claims 1 to 8, water, a hydraulic powder and/or a filler other than clay and clay.

13. The slurry according to Claim 12, further comprising a high-performance water reducing agent or a high-performance AE water reducing agent.

14. A slurry according to Claim 12 or 13, as a pipe jacking additive for pipe jacking method.

15. A method of modifying slurry rheology, comprising the step of adding the surfactant composition according to any

one of Claims 1 to 8 to the slurry.

16. The method according to Claim 15, in which the kit according to Claim 9 is used.

17. A method of pipe jacking, comprising using the slurry according to Claim 12 or 13 as a pipe jacking additive.

18. Use of the slurry according to Claim 12 or 13 as a pipe jacking additive for pipe jacking method.